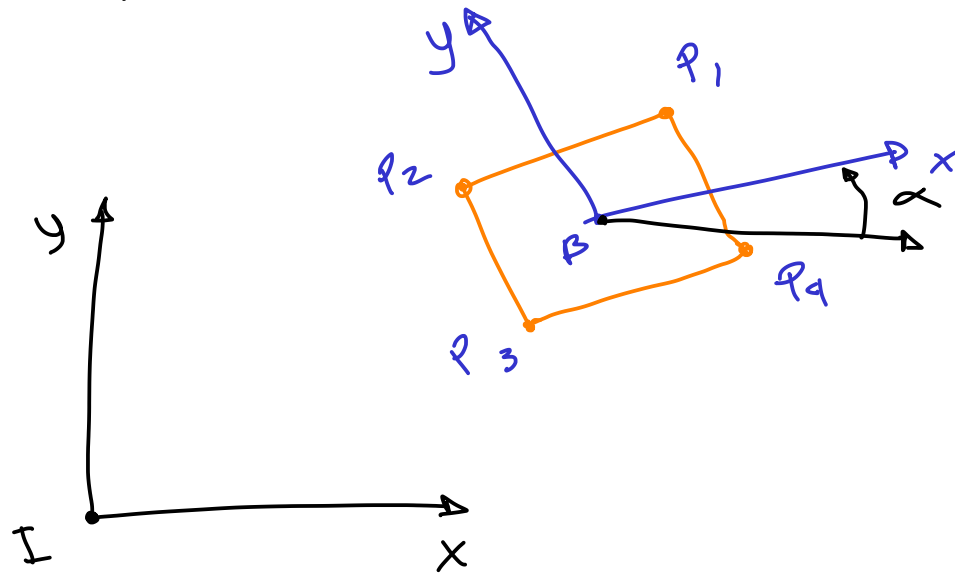


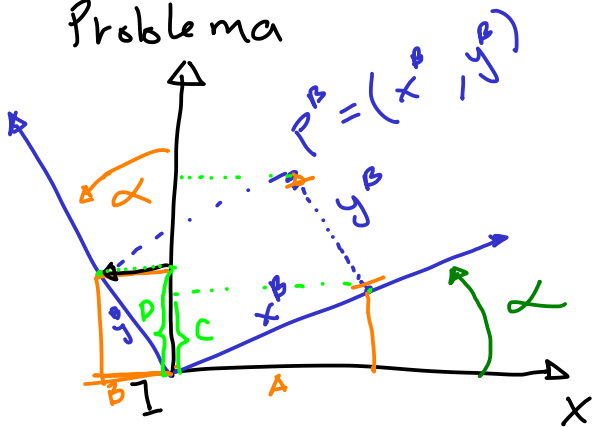
# Matrices de Rotación

## Motivación

B = Body frame  
I = Inertial frame



## Problema



$$P^I = (x^I, y^I)$$

$$x^I = A + B = x^B \cos \alpha - y^B \sin \alpha$$

$$\cos \alpha = \frac{A}{x^B}$$

$$A = x^B \cos \alpha$$

$$\sin \alpha = \frac{B}{y^B}$$

$$B = -y^B \sin \alpha$$

$$y^I = C + D$$

$$\sin \alpha = \frac{C}{x^B}$$

$$C = x^B \sin \alpha$$

$$\cos \alpha = \frac{D}{y^B}$$

$$D = y^B \cos \alpha$$

$$x^I = x^B \cos \alpha - y^B \sin \alpha$$

$$y^I = x^B \sin \alpha + y^B \cos \alpha$$

$$x^I = x^B \cos \alpha - y^B \sin \alpha$$

$$y^I = x^B \sin \alpha + y^B \cos \alpha$$

$$\begin{bmatrix} x^I \\ y^I \end{bmatrix} = \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix} \begin{bmatrix} x^B \\ y^B \end{bmatrix}$$

$P^I = \underline{\underline{R}} \cdot P^B$

Matriz de rotación en Z =  $R_{Z, \alpha}$